

Shellfish Propagation in Westport, Massachusetts
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Final Report for
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Agraqua200
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Located in southeastern Massachusetts at the entrance to Buzzard's Bay, the town of Westport (Figure 1) has a long history as a municipality with strong ties to the marine environment. To that end, Westport residents have developed some reliance on the valuable natural resources associated with the local aquatic environment. Among Westport's many coastal amenities, shellfish and the fisheries focused on the shellfish resources are clearly among the most valuable in economic, recreational and aesthetic terms.

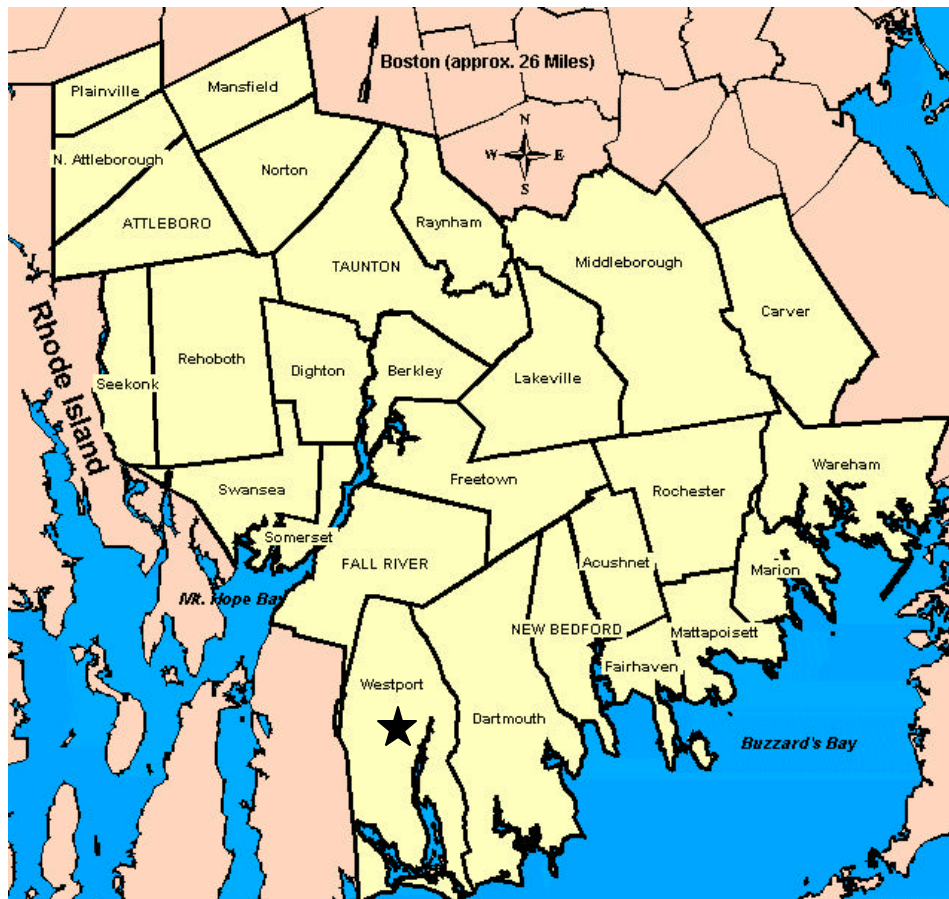


Figure 1. The town of Westport in relation to Buzzard's Bay Massachusetts.

The activities undertaken for AGRAQUA200 Shellfish Propagation in Westport were part of the town's ongoing efforts to provide sustainable shellfish resources for the

commercial and recreational enjoyment of residents and visitors to Westport, Massachusetts. This project was developed to demonstrate and document three primary components of the town's shellfish resources enhancement program. To that end, the following narrative provides information about shellfish hatchery efforts, shellfish seed propagation and a shellfish relay program undertaken during the summer of 2000.

The Town of Westport Shellfish Department has two up-weller systems (one tidal and one land based) that are both operated in collaboration with a local group of fishermen (see photos # 1 and 2). The S.S.A. or Southeast Shellfish Association have willingly worked with the town to help enhance the Town's Shellfish stocks with the aid of two up-wellers and a hatchery. As the name implies, shellfish up-weller systems work by algae rich water flowing into some form of trough or raceway and then up and through a bed of shellfish that are retained in a silo (Figure 2.).

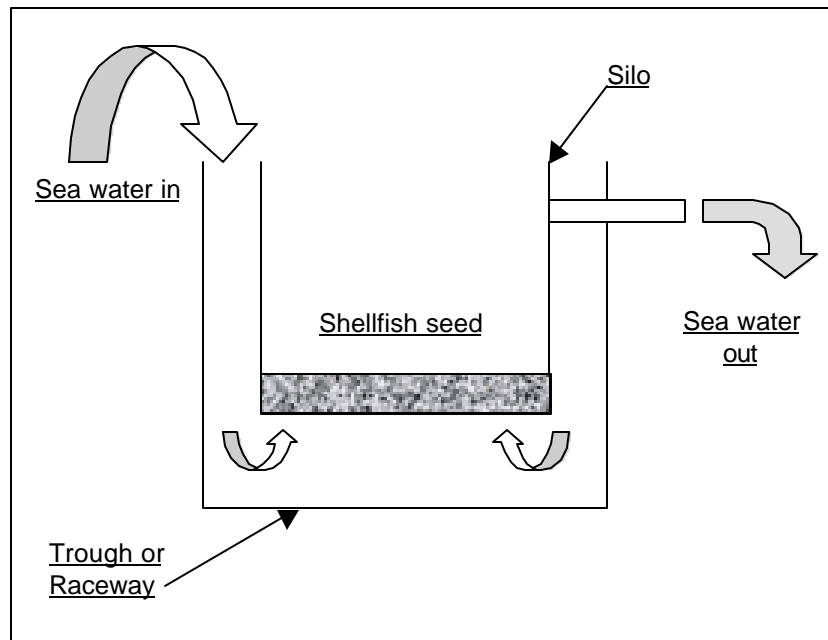


Figure 2. Generic Up-Weller Schematic

The land-based up-weller is located at the town dock at Westport Point, and it uses a submerged $\frac{3}{4}$ hp pump that distributes ambient seawater to 28 silos (photo #3). The floating upweller was constructed using a design from an NCRI publication by Bill Mook of Damarascotta, ME. The tidal up-weller is moored in the east branch of the Westport River (approx. 200 yards north of the Fontaine bridge) (Figure 3.) using a point mooring and is powered by a 3.5 – 4 knot current (photo #4). The tidal up-weller holds 16 silos (photo #5). Both up-wellers were cleaned and painted by Westport Shellfish Department and then put back into service during March (land based) and June (tidal) (photos 6 and 7). A diver inspected the mooring and attachments on the tidal upweller and some corrections were addressed.

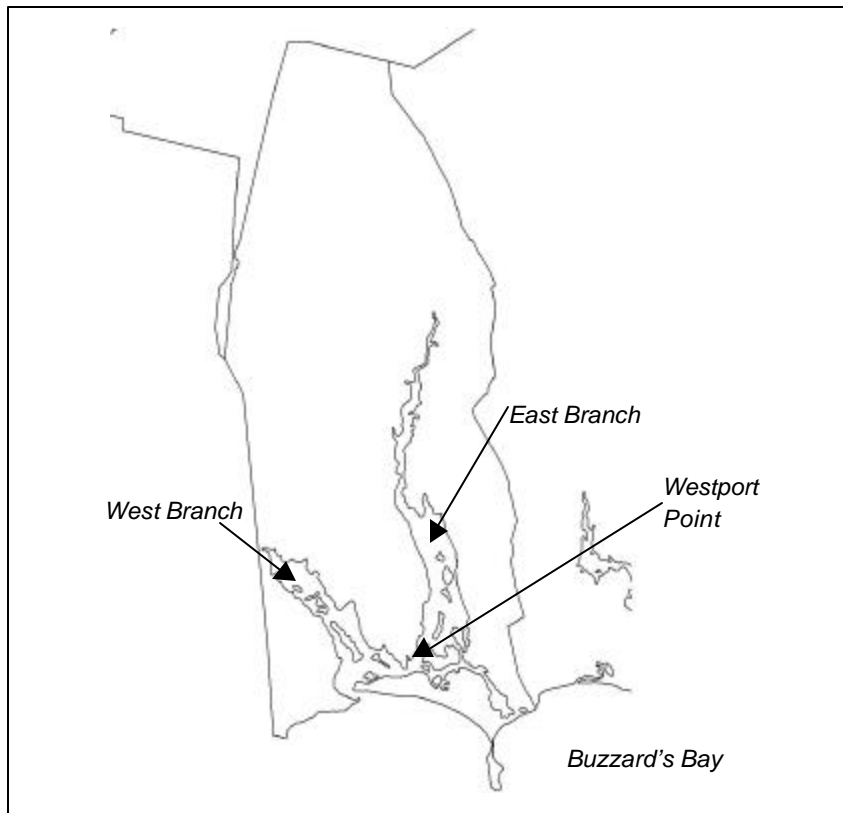


Figure 3. Westport Point, the East and West Branches of the Westport River, Westport Massachusetts

The hatchery was cleaned and algae were purchased. Once the algae arrived we started the cultures, watching the temperature because we do not have heat in our facility. We started three different types of algae (*Tetraselmis*, *Isocrysis* and *Nannochloropsis*) (photo #8 and 9). Once there were sufficient densities of algae, we collected adult quahogs and conditioned them overnight in the refrigerator for temperature shock spawning the following day. The first attempt to spawn the quahogs was unsuccessful. The next attempt was successful. The eggs and sperm were placed in containment until they became veligers. We fed the larval shellfish twice a day and changed the water as needed, once the larvae set, they were placed in a down-weller system and fed daily. Once the juvenile quahogs reach a size of approximately 2 millimeters we will put them into the land based up-weller system.

The relay part of our grant included quahogs and oysters. The Town purchased 1,760 bushels of quahogs from a closed area in Swansea MA. With the help of volunteers, we also relayed 600 bushels of contaminated oysters (photos #10-12) from closed areas in the east branch of the Westport River, into an open area of the ecosystem. Both of these relays involved many fishermen and their equipment for digging and spreading the shellfish to a desirable area (photos #13-15). The Division of Marine Fisheries was very helpful permitting the shellfish relay activities that were undertaken by the town. The Highway Department donated two trucks and two men (photos #16 and 17) to transport the quahog stocks from Swansea to Westport over a two-week period.

The project planned to purchase 1.7 million quahog seed from a commercial hatchery. A request for bids was developed (attachment A) and several potential vendors of shellfish seed were contacted. Unfortunately, the seed vendor selected (Marine Bioservices, South Bristol, ME) was unable to fulfill the terms of the contract for 1.7million r4 quahog seed (attachment B) and could only provide 850,000 or 50% of the shellfish seed ordered. Accordingly, an alternate vendor (Cape Cod Oyster, Osterville, MA) was selected from the previously collected bids to provide the seed (850,000) shortfall (attachment C). The 850,000 seed provided by the original vendor were classified as R4 (i.e. retained on a 4 millimeter mesh screen) and at a size of 5 to 6 millimeters. The seed was placed in the 30 silos in both up-wellers (16 silos in the tidal up-weller and 14 silos in the land based system) (photo #18 and 19). Daily washing of the silos was conducted to maximize food and eliminate competition for oxygen by other fouling organisms (photo #20). The seed appeared to be growing at equal rates for both up-weller systems. This stock in each up-weller system will be sorted at the end of the season and the larger seed will be field planted or broadcast (photo #21) in open areas of the river as is typically done each season. A large percentage of the seed should reach legal size within 3 seasons for the public to harvest and enjoy.

The problems encountered with projects in this grant were not major except for the breach in contract for the shellfish seed.

The shellfish relay component of the program went very smooth in terms of lining up volunteers and lining up trucks with drivers. The Hatchery had a temperature problem (too much fluctuation between hot and cold temperatures) that delayed us on the spawn. The only way to overcome this is to have regulated temperature in the building with some kind of insulation in the walls. The spawn could have been earlier if conditions were favorable allowing us to get more spawns. The problem with the seed contract with the commercial hatchery was a big set back due to the time that was lost for growing the quahogs in the up-wellers. If the seed isn't delivered on time or if I have to get the next bid at a later date, we lose the growth and small seed are more susceptible to predator problems and winter mortality. All things considered I feel we have met and exceeded our goals this season. The enhancement of public shellfish areas is an ongoing project due to the numbers of people enjoying the resource as a recreational or commercial entity. To that end, licenses and permits for shellfishing this year are approaching 800 within the first 7 months. We haven't established a way of measuring the enjoyment factor with the recreational permit holder yet, but know that this impact is substantial. Increases in shellfish populations have a broad range of economic impacts in a town. The fishermen use gas, oil, boats, motors, shellfish equipment, and safety equipment for harvest and most of these items are purchased in the town. The dollars earned are also spent locally on dining, entertainment and community events (e.g. fairs, outings, etc) (photos #22 and 23). Estimates suggest that there is an economic multiplier of seven for dollars generated by commercial fishing activity. With that in mind, we anticipate that for every \$1 of fish harvested and sold from the Westport environment there is a \$7 economic impact on our local economy. As an example the estimated \$250,000 value of shellfish harvested in Westport during the 1999 fishing season, actually lead to an economic impact of nearly \$1.75 million. Our commercial values can be measured

through catch reports and for the most part the shellfishermen do have a good time catching their product. Clearly, the town's efforts to enhance the shellfishery resources contribute to this impact and enable the continued prosperity associated with the resource (photo # 24).

Shellfish Constables are always trying to enhance shellfish areas with programs that employ public or municipal aquaculture activities. We feel that it is in the town's best interest, to employ the best available programs to promote the shellfishery for the public. These programs enhance natural resources and are truly considered aquaculture at a scale larger than that run by most private grant holders. We attempt to enhance what Mother Nature provides in order to alleviate the pressure due to the number of people competing for shellfish resources. Public education about our activities and the aquatic resources of the town is also an important component of our work. To that end, the Westport Shellfish Department has participated in many educational outreach type programs that enable school kids to enjoy hands on learning about our ecosystem and local natural resources (attachment D). The combination of our activities in the field and in the classroom generates interest and ensures the sustainability of our resources for future generations.

List of Attachments:

Attachment A	request for bids for 1.7 million quahog seed
Attachment B	letter from Marine Bioservices to Westport dated 7/12/2000
Attachment C	town of Westport Purchase Order. #3065 for Cape Cod Oyster, Co.
Attachment D	The Chronicle, WES Students Meet “People in Science”. 5/10/2000